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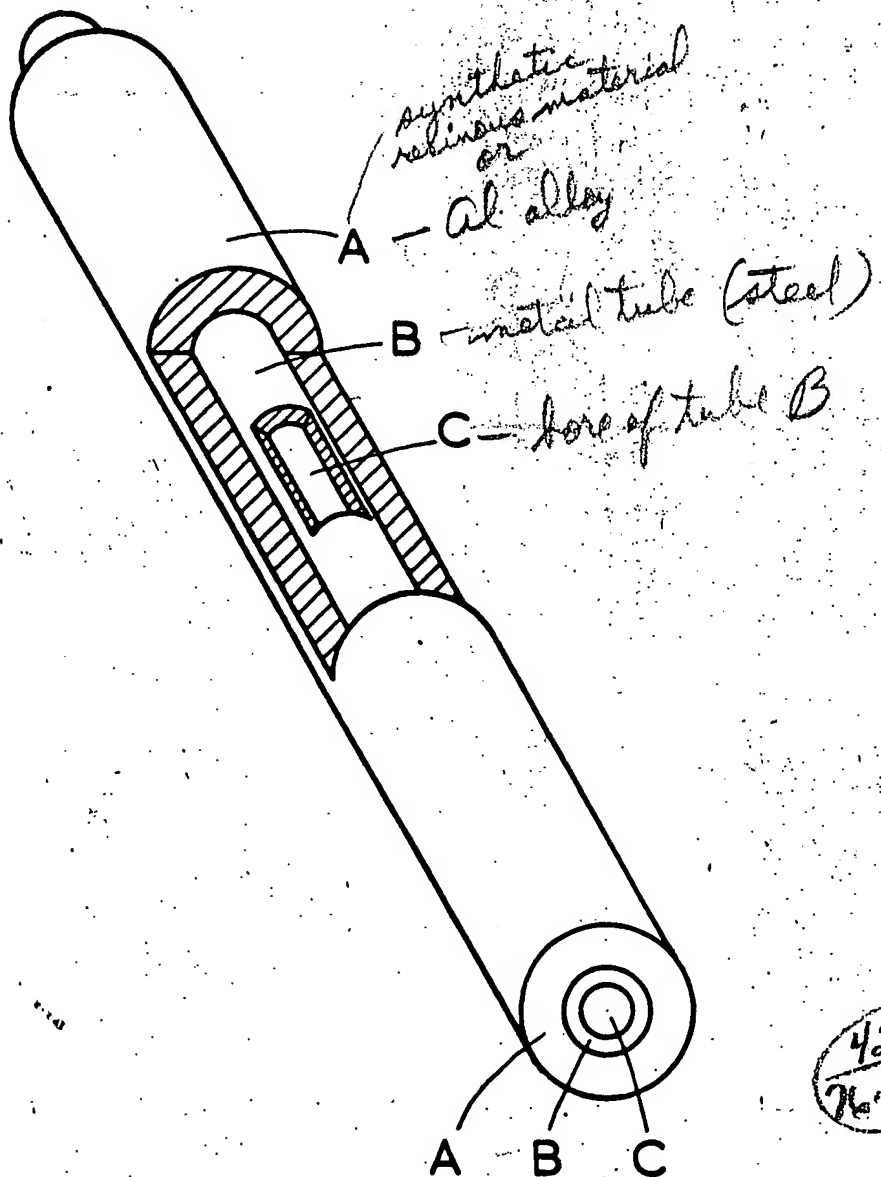
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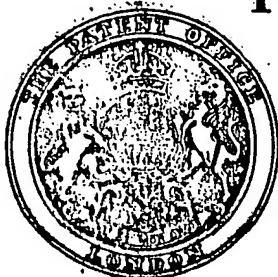
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COMPLETE SPECIFICATION

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PATENT SPECIFICATION

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Date of filing Complete Specification: Sept. 18, 1950.

Application Date: Dec. 8, 1949. No. 31502/49.

Complete Specification Published: Sept. 17, 1952.

Index at acceptance:—Class 119, A12a.

COMPLETE SPECIFICATION

Fore-End for Rifles

I, DAVID TURNER, a Subject of the Queen of Great Britain, of "Brambles," 187, Broughton Road, Banbury, in the County of Oxford, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to rifles, and aims to provide a method of construction of a type of fore-end which will be less effected by conditions of dampness or heat than a fore-end as usually made of wood, will not warp or decay with the passage of time, and which will improve the accuracy of shooting of the rifle to which it is applied by tending to suppress the barrel vibrations which occur when it is fired.

At present the majority of rifle fore-ends are constructed of wood, separately from the barrel of the rifle. The wood is carved out, shaped to fit the barrel as closely as possible, and then applied to it by means of screws, bands of metal, or other fixing devices. It is almost impossible to fit a fore-end in this manner without applying small bending stresses to the rifle barrel, and since wood varies appreciably in its dimensions according to the humidity of the atmosphere, these stresses are likely to vary from day to day. This is detrimental to the accuracy of the weapon.

Attempts have been made to eliminate the effects of the wooden fore-end on the shooting properties of the rifle by fixing it (to the receiver or other part of the weapon) in such a way that it projects forward under the barrel to form a convenient hand-hold, but does not touch it at any point. With this type of fore-end barrel vibrations are not hindered in any way, and inaccuracies due to variations in the firmness of the firer's hold, in the position he adopts, and in the type of ammunition he uses, become more pronounced.

This invention is the result of an attempt to provide a rifle with a fore-end which, while almost eliminating barrel vibrations by supporting the barrel rigidly, will not tend to distort the barrel, or to change appreciably in dimensions under widely varying atmospheric conditions. In order to achieve these aims two principles must be borne in mind. First, in order that barrel vibrations may be reduced to an insignificant order the fore-end must be made of a material which is rigid, suitably heavy, and dimensionally stable under varying atmospheric conditions. Second, in order not to distort the barrel, and so that it will fit perfectly and tightly around it, the material must be applied in a soft or liquid state. The application of these two principles forms the essential part of the invention, and several methods of constructing a fore-end according to them will now be described.

To obtain the full benefit from this invention, the fore-end should be made in the form of a thick-walled tube completely surrounding the greater part of the length of the rifle barrel, but the precise form, size, and material of the fore-end will naturally be determined by individual requirements as to weight and shape.

The fore-end is best formed by incorporating the rifle barrel in a suitable mould, pouring the material from which the fore-end is to be made around it in a molten state, and allowing it to solidify around the barrel. The casting thus formed may afterwards be worked by other means to the exact shape required. This method shows the invention in its simplest and clearest form, and will hereinafter be referred to as the "original method" of construction. It may be used when the fore-end is to be made from a material such as a metallic alloy of low melting point when the temperature at which the material is cast is not high enough to damage the barrel.

It may be thought desirable to construct the fore-end from a suitable synthetic resinous material or the like, in which case suitable modifications of the original method may be employed according to the thermoplastic or thermosetting properties of the particular material used.

If the material chosen for the fore-end is a metal or alloy with a high melting point, the thermal shock produced when it is poured into the mould may be sufficient to warp or distort the barrel. The high temperature produced may also cause the bore to become damaged by oxidation. The alternative methods of construction described hereinafter may be used in this case.

In the first alternative method of construction, the material of the fore-end is first cast around a tube of steel or other metal able to withstand the effect of the heat of the liquid without undue change in shape or other properties. The inside diameter of the tube should be sufficient to accommodate the barrel of the rifle loosely, alternatively the rifle barrel may be modified so that it will fit easily into whatever tube may be conveniently available. After the casting has solidified and cooled any oxide formed is cleaned from the inside of the tube, the barrel is inserted into it, and secured by soldering in such a way that the space between the barrel and the tube is completely filled with solder. It may be found convenient to use a material other than solder for this purpose, but whatever material is used it should be noted that this method is in principle and effect the same as the original method, and is consistent with the two principles set out above as the essential part of the invention.

If, using the first alternative method of construction, the temperature at which the alloy is to be cast is high enough to be liable to deform or warp the metal tube around which it is to be poured, the tube should have a rather smaller internal diameter to allow it to be trued up by reaming, boring, or some other method before the rifle barrel is inserted. Alternatively a metal rod may be used instead of a tube, the rod being bored out from end to end after the casting has cooled, and the rifle barrel inserted as before.

In the second alternative method of construction, the material chosen for the fore-end may be cast or moulded around a metal rod, or a metal tube of suitable bore, and allowed to solidify. The metal rod or tube is then worked by suitable means to form the barrel of the rifle.

In order that my invention may be more readily understood and carried into prac-

tice, I have appended a drawing which will illustrate each of the methods of construction described above.

The drawing represents, in oblique projection, a fore-end constructed by the first alternative method. It has been cut away at the centre in order to show the details more clearly. B is the metal tube, which has been incorporated in a suitable mould and the material A has been cast around it. In this case A would probably be an aluminium alloy, and B would be of steel. C is the bore of the tube B, and is a shade larger than the outside of the rifle barrel, which will later be inserted and secured into position as described.

If the fore-end illustrated had been made according to the original method or the second alternative method of construction, B would be the barrel of the rifle, C the bore, and A the fore-end itself, cast around it as described above.

If the material from which the fore-end is to be made has a coefficient of thermal expansion which differs appreciably from that of the rod, tube, or rifle barrel around which it is to be cast, it may be found necessary to provide a collar or similar projection on the outside of the rod, tube, or barrel, in order to anchor the casting into position.

What I claim is:—

1. A method of constructing the fore-end of a rifle, whereby the material used is a metal, metallic alloy, suitable synthetic resinous material or other material sufficiently heavy and rigid appreciably to reduce the barrel vibrations which occur when the rifle is fired, and whereby the material is applied directly onto or around the barrel of the rifle by casting or moulding as appropriate to the actual material selected.

2. A method of constructing the fore-end of a rifle, whereby a material as in claim 1 is cast or moulded around a metal tube into which the rifle barrel is then secured by soldering or a like method.

3. A method of constructing the fore-end of a rifle, wherein material as in claim 1 is cast or moulded around a metal rod, which is then bored out from end to end to form a tube into which the rifle barrel is secured as in claim 2.

4. A method of constructing the fore-end of a rifle, wherein material as in claim 1 is cast or moulded around a metal rod, or metal tube of suitable bore, which is then fashioned by suitable means to form the barrel of the rifle.

Dated the 7th day of April, 1952.

D. TURNER.

PROVISIONAL SPECIFICATION

Fore-End for Rifles

I, DAVID TURNER, a Subject of the Queen of Great Britain, of "Brambles," 187, Broughton Road, Banbury, in the County of Oxfordshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to rifles, and has for its object the provision of a fore-end which will not be affected to any great extent by conditions of dampness or heat, will not decay or warp with the passage of time and which will improve the accuracy of the shooting of the rifle by hindering barrel vibrations.

According to the present invention, a substantial coating of metal, plastic such as polythene, perspex or bakelite, or other suitable material, is formed around the barrel of the rifle in the place of the usual wooden fore-end, so that it envelopes the barrel more or less completely. This coating is preferably formed by moulding or casting, so that it surrounds the barrel closely and firmly, but does not tend to distort it in any way. It may be cast directly onto the barrel itself, or first moulded onto a tube of some other material and the rifle barrel inserted into this tube and secured by soldering, or by some other method. In either case, the barrel, or tube as the case may be, should be provided with a projection of some kind near one end, to secure the moulded outer coating, and prevent it from mov-

ing along the barrel or tube as it expands and contracts when the temperature rises and falls. This projection may be in the form of a screw or peg, inserted into the wall of the barrel or tube in such a way as to project somewhat into the surrounding coating of metal, plastic, or whatever material is used.

In the present form of the invention, the fore-end is made of an alloy of aluminium, which is cast around a substantial rod of mild steel. This rod has a segment of steel welded to it near the breech end so that it forms a transverse ridge or projection extending halfway around its circumference. This ridge acts as an anchor for the aluminium alloy casting. After being moulded to the approximate shape required, the alloy casting is formed by turning, grinding, or other means to such a shape as may be found to be convenient. The central steel rod is then bored out from end to end, so that it forms a tube firmly encased in the aluminium alloy, and the rifle barrel is ground, turned, or otherwise reduced to an outside diameter a shade less than the diameter of the bore of the tube. The barrel is then inserted into the tube, and soldered into position.

Dated the 7th day of December, 1949.

D. TURNER.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1952.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.